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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

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MEMORANDUM

SUBJECT: Environmental Fate and Effects Division Review of the New Chemical Furfural Proposed for **Indoor Use Only**, in Greenhouses and Other Structures

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This memo summarizes the Environmental Fate and Effects Division's (EFED) review of submitted materials in support of a proposed registration of the new (unregistered) active ingredient furfural (MULTIGUARD PROTECT) for indoor use only, in greenhouses and other structures. A previous EFED review (4/27/04-Approved) outlined data requirements for both indoor and outdoor uses (the latter including shadehouses and other uses that are not strictly indoors). This memo is not a risk assessment of outdoor use and does not support any such use, including shadehouses or other uses that are not strictly indoors.

The 3/22/05 revised label states: "For use in growing media and/or soils in greenhouses for cut flowers, cut greens, transplants, propagative materials, ornamentals and other non-food/nonfeed commodities. The term 'greenhouse' includes any enclosed structure type with a nonporous covering and is large enough to allow a person to enter. MULTIGUARD™ PROTECT may also be used in growing media and/or soils in malls, atriums, conservatories, completely enclosed portions of arboretums, and office buildings that grow or maintain plants primarily for decorative or environmental benefits. When used as directed, MULTIGUARD™ PROTECT controls root infesting plant parasitic nematodes and fungal plant diseases such as *Phythium, Phytophthora, Fusarium* and *Rhizoctonia*".

Registration Division coordinated a meeting between OPP staff and the registrant on 4/19/05. At this meeting, the registrant indicated that they were willing to add the statement "For Use in Fully Enclosed Structures Only" in a prominent location on the label, as well as repeat it in the Directions for Use. If this is done, it should make it clear to the user that the product is not for use in partially enclosed structures (e.g., shadehouses). EFED considers partially enclosed structures to be outdoor uses that would require substantial additional data and risk assessment.

Environmental Fate Data Requirements:

Three studies and additional data have been submitted and revised in support of the greenhouse and other strictly indoor uses.

The hydrolysis (§161-1) study (MRID# 46011004, refer to 4/27/04-Approved EFED memorandum) has been classified as Acceptable. In this study, furfural appeared to be stable in buffered solutions of pH's 5, 7, and 9 (see also EFED memorandum of 11/24/04, D295312, and DER dated 5/6/04).

Furthermore, the registrant submitted an aerobic soil metabolism (§162-1) study (MRID# 46011007 and additional data MRID#'s 46510602 and 46523701). The study is classified as supplemental (see DER dated 06/14/04 with cover memorandum dated 11/24/04 and EFED memorandum dated 09/20/05). The available data are sufficient to support the indoor and greenhouse uses. Furfural appears to degrade rapidly in four sandy loams with observed half-lives of <1 day. Studies performed with archived samples (stored for a period of 15 months at -20°C) indicate that the major transformation product is 2-furoic acid.

Finally, a batch equilibrium - adsorption/desorption (§163-1) study (MRID# 46011006, and additional data MRID# 46523801) was classified as supplemental (see DER dated 07/18/04 with cover memorandum dated 11/24/04 and EFED memorandum dated 09/20/05). The data available is sufficient to support the indoor and greenhouse uses. It appears that furfural residues are highly mobile in three sandy loam soils ($K_{F,OC}$ range 52.2-56.9) and has low mobility in a Bog sand with a very low organic carbon content ($K_{F,OC}$ = 607.3; OC=0.06%)

Ecological Effects Data Requirements:

EFED does not do ecological risk assessments of indoor uses. However, avian acute oral toxicity, freshwater fish acute toxicity, and freshwater aquatic invertebrate acute toxicity studies are generally needed to support manufacturing use products (MP) to be reformulated into greenhouse and indoor end-use products (or to support such end-use products where there is no MP). This data is intended to support labeling in the event of spills.

The registrant (ToXcel LLC, on behalf of Agriguard Company LLC) has submitted a variety of acute toxicity data, in part to also support future (Phase II) outdoor use. Those data relevant to the proposed indoor use are summarized below.

1) 850.2100 avian acute oral toxicity. Mallard and Japanese quail acute oral toxicity studies have been submitted. EFED concludes that furfural is considered moderately toxic to the mallard, with an LD50 of 360.5 mg/kg in an Acceptable study; furfural is considered moderately toxic to the Japanese quail with an LD50 of 278.5 mg/kg in a Supplemental study.

2) 850.1075 acute fish toxicity. Bluegill and rainbow trout studies have been submitted. EFED concludes that furfural is considered moderately toxic to the rainbow trout with an LC50 of 3.06 ppm in a Supplemental study; furfural is considered moderately toxic to the bluegill sunfish with an LC50 of 5.8 ppm in an Acceptable study.

3) 850.1010 acute aquatic invertebrate toxicity. A *Daphnia magna* study has been submitted. EFED concludes that furfural is considered slightly toxic to *D. magna* with an LC/EC50 of 20.4 ppm in an Acceptable study.

EFED Label Recommendations

Since neither of the two avian acute oral studies produced LD50 values $\leq$ 100 mg/kg and none of the three acute aquatic studies produced LC50 values $\leq$ 1 ppm, specific toxicity statements for these organisms are not currently specified as a result of these studies. However, based on an avian screening LD50 (98 mg/kg) for an apparently more sensitive species (red-winged blackbird) (Schafer, et. al., 1983), reference to which was previously submitted by the registrant, an avian toxicity statement is indicated.

i. Manufacturing Use Product:

This pesticide is toxic to birds. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

***ii. End-Use Product*:**

This pesticide is toxic to birds. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate.